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EFFECTS OF A PAIRING CONTINGENCY ON BEHAVIOR IN A THREE-PERSON PROGRAMMED ENVIRONMENT

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Four groups of three subjects resided for 10 days within a continuously programmed environment. Subjects followed a behavioral program of contingently scheduled activities that determined individual and social behaviors. A triadic condition was in effect when all three subjects were required to select simultaneous access to a group area before it became available for a social episode. A dyadic condition was in effect when access to a group area was permitted to any combination of two, and only two, subjects. The effects of these two conditions on individual and social behaviors were studied in reversal designs with several successive days devoted to each condition. Results showed that durations of social activities and synchronization of individual activities were greater during triadic conditions than during dyadic conditions. Under both conditions, wake-sleep cycles departed from a typical day-night rhythm for most subjects. Instances when subjects did not respond to each others' attempts to initiate conversations using the intercom were generally more frequent during dyadic than triadic conditions. Physical distance during triadic social episodes was found to be related to sociability levels during dyadic conditions.

Key words: pairing contingency, social behavior, behavioral program, continuously programmed environment, social systems, humans

Emurian, Emurian, Bigelow, and Brady (1976) studied the social behavior of groups of three young-adult men residing in a continuously programmed environment. When noncooperation contingencies were scheduled, access to a group area could be selected by individual subjects without regard to the selections of the other two, whereas cooperation contingencies required simultaneous selection by all three group members. A general finding was that the cooperation contingency increased the frequency of activities involving all three group members, although a significant amount of triadic activity also occurred under the noncooperation conditions. In addition, there was some indication of division of the group into a two-person ingroup and a lone member, since under the noncooperation condition two of the members spent more time together than either did with the third member. However, the degree of isolation was not extreme for such low-pairing subjects, since triadic activities continued to occur during the noncooperation condition.

The present experiment evaluated further the effects of subject pairing on individual and social behavior. In addition to the triadic contingencies studied previously, dyadic contingencies were scheduled when simultaneous occupancy of a group area was permitted to any combination of two, and only two, subjects. Solitary access to group areas also was permitted to separate social interactions and access to large spaces as reinforcers. Finally, the behavioral program included a group task that required individual contributions to a group criterion before triadic or dyadic episodes could occur.

METHOD

Subjects

Four groups of three male subjects were recruited from local colleges. Members com-

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prising each group were acquainted, and all were full-time students. Subjects received psychometric and interview assessment by a staff psychiatrist before being accepted. All subjects were fully informed about the experiment's procedures, and informed consent was obtained. They were familiarized with the operational features of the laboratory during two daily briefing sessions immediately preceding the start of the experiment. Subjects were told that they would each receive $5 per day if an experiment were terminated prematurely by their choice and $25 per day if all three subjects completed the duration agreed on beforehand.

Apparatus

The programmed environment was composed of three 2.6 by 3.4 by 2.4 m private rooms, a 4.3 by 6.7 by 2.7 m recreation room, a 2.6 by 4.1 by 2.7 m workshop, and a 2.3 by 7.9 by 2.4 m hall joining the rooms. The characteristics of this environment are described in detail elsewhere (Bigelow, Emurian, and Brady, 1975; Brady, Bigelow, Emurian, and Williams, 1975).

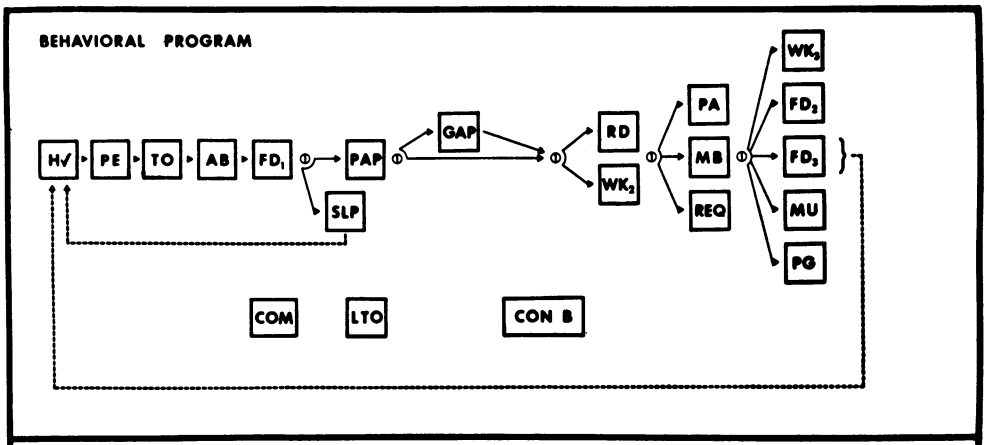
Behavioral Program

Figure 1 presents a diagrammatic representation of the behavioral program governing the sequential and contingent relationships of activities employed throughout the series of observations. The essential features of the program have been described previously (Emurian *et al.,* 1976). From the standpoint of the present study, the critical features are the Work Three and Food Three activities, both of which occurred in the group areas of the environment. The first of these, Work Three, provided at least 30 min in the workshop where assembly projects and maintenance chores were conducted, and the second, Food Three, at least 30 min in the recreation room where major meals could be eaten or games played. Two additional activities were added to the program. The Group Arithmetic Problems activity could be selected immediately following completion of Private Arithmetic Problems. During the Group Arithmetic Problems activity, the subject could work privately on the problems to contribute to a group criterion of 600 solutions. This criterion had to be satisfied before Work Three and Food Three could be selected by more than one subject, and a counter, present in each private room, showed cumulative contributions to this criterion by all subjects combined. Once a subject had selected the group task, he was required to solve at least one arithmetic problem correctly before selecting another activity. The Group Arithmetic Problems task was included to determine the extent to which responding could be maintained by access to different social situations, *i.e.,* triadic and dyadic. The Private Games activity, providing at least 30 min access to an assortment of solitary games and puzzles in a drawer, was added as an option in the last column of optional activities.

An intercom for conversations among subjects was mounted on a work panel in each private room, making it possible for a subject to communicate with either of the other subjects or with both simultaneously. When an individual subject initiated a communication, a buzzer sounded whenever he pressed a button, and a light remained illuminated on the other subjects' intercom for as long as the communication attempt persisted. However, the Communication *activity* (see Figure 1), which provided access to the intercom to initiate or answer a communication, could be selected only according to the rules of the behavioral program. It was possible, then, for a subject to be within the Communication activity alone while attempting to converse with the other subjects, who may have been either indisposed to answer immediately or currently ineligible to select the Communication activity because the minimum requirements of their other behavioral program activities had not been satisified.

No communications were exchanged between experimenters and subjects, other than an occasional textual message presented on subjects' cathode ray display screens to inform them of an equipment problem or to clarify misunderstanding of the behavioral program protocol.

Each activity within the behavioral program had a 12.7- by 20.3-cm metal card portraying an abbreviated activity notation that a subject was required to display whenever that activity was selected. To select an activity, a subject displayed the card corresponding to that activity on a hook mounted on a bed cabinet. When an activity card was displayed, environmental events and response requirements related to that activity were in effect.



INVENTORY OF ACTIVITIES

NOTATION	FULL NAME	BRIEF DESCRIPTION
H√	HEALTH CHECK	TEMPERATURE, PULSE, WEIGHT, STATUS REPORT
PE	PHYSICAL EXERCISE	300 CORRECT PRESSES ON AUTOMATED TASK
TO	TOILET OPERATIONS	USE OF PRIVATE BATHROOM AND CONTENTS OF DRAWER CONTAINING TOILETRIES
AB	AUTOGENIC BEHAVIOR	RELAXATION EXERCISES ON CASSETTE TAPE
FD1	FOOD ONE	TWO SELECTIONS FROM A LIST OF LIGHT FOODS
SLP	SLEEP	USE OF BED AND PRIVACY CURTAIN
PAP	PRIVATE ARITHMETIC PROBLEMS	150 CORRECT SOLUTIONS OF ARITHMETIC PROBLEMS
GAP	GROUP ARITHMETIC PROBLEMS	OPTIONAL, CONTRIBUTE CORRECT SOLUTIONS OF PROBLEMS TO GROUP RATIO CRITERION
RD	READING	ACCESS TO BOOK
WK2	WORK TWO	PROBLEMS, EXPERIMENTS, ASSEMBLY PROJECTS
PA	PUZZLE ASSEMBLY	ASSEMBLE A PUZZLE
MB	MANUAL BEHAVIOR	ACCESS TO ART MATERIALS
REQ	REQUISITION	EARN DELAYED DELIVERY OF TREATS
WK3	WORK THREE	ACCESS TO WORKSHOP
FD2	FOOD TWO	PRIVATE MAJOR MEAL
FD3	FOOD THREE	MAJOR MEAL IN RECREATION ROOM, GAMES
MU	MUSIC	EARN A CASSETTE TAPE
PG	PRIVATE GAMES	ACCESS TO SOLITARY GAMES
COM	COMMUNICATION	ACCESS TO INTERCOM
LTO	LIMITED TOILET OPERATIONS	ACCESS TO ESSENTIAL TOILET FACILITIES
CON B	CONDITION B	CHANGE IN PROGRAM CONDITION

Fig. 1. A diagrammatic representation of the behavioral program governing the sequential and contingent relationships of activities. This program is identical to the one reported in Emurian *et al.* (1976), with the addition of Group Arithmetic Problems and Private Games.

A manual of instructions detailing the program and use of environmental resources was contained in each room of the environment. The manual informed subjects that the intercom should be used before selecting a social activity to ensure agreement that such an activity would be selected simultaneously by participating subjects. Instructions between conditions differed only with respect to presenting the different options that were available. An error in following the behavioral program caused a 5-sec blackout. If not immediately corrected, a message was presented on the cathode ray display screen to clarify the source of misunderstanding.

Procedure

Subjects followed the behavioral program continuously throughout the 10-day periods of residence. Additionally, rules of access to Work Three and Food Three were varied to permit evaluation of the effects of a pairing contingency on individual and social behaviors.

A triadic program condition was in effect when either of two social activities within group areas, *i.e.*, Work Three and Food Three, was accessible only when all three subjects selected it together. When all three subjects had displayed their selection cards, they were

permitted to leave their private rooms one at a time and to enter the appropriate group area. Typically, subjects would use the intercom several activities in advance to plan subsequent selection of a triadic activity. They would then pace their individual schedules accordingly to arrive at the choice point in the program at approximately the same time. Subjects almost always used the intercom immediately before displaying their Work Three or Food Three cards to ensure that their schedules and choices were synchronized. During the triadic condition, 600 counts on the Group Arithmetic Problems task were required before either Work Three or Food Three could be selected by a triad. The group task counters reset after the selection.

In contrast to the triadic condition, a dyadic program condition was in effect when Work Three and Food Three were accessible for social activities by any combination of two subjects. As in the triadic condition, 600 counts on the group task were required before either activity could be selected by a dyad. In both conditions, subjects were required to enter and leave the group areas at the same time. Once a group area was occupied by a dyad, access to that area by the third subject was denied until the activity was terminated by the dyad.

Solitary selection of the Work Three and Food Three activities was permitted during the dyadic conditions for Groups 1 and 2, and during both triadic and dyadic conditions for Groups 3 and 4. For solitary selection, it simply was necessary for a single subject to display the corresponding activity card, and entrance to the group area was permitted immediately, unless another subject or dyad had already selected the activity.

For Groups 1 through 4, the dyadic (D) and triadic (T) conditions were investigated in the following order and number of successive days under each condition, respectively: T-D-T (days: 4,3,3), D-T-D (days: 4,3,3), T-D-T (days: 4,3,3), and D-T-D (days: 4,3,3). These sequences were used to control for the effects of the order in which the conditions were presented. For Groups 1 and 2, there was no upper limit on the durations of the Work Three and Food Three activities, but for Groups 3 and 4, a 3-hr upper limit was in effect.

Pairs of research assistants monitored the experimental environment continuously with audio and video equipment located, with the subjects' knowledge, in each room. When a subject displayed an activity card, an assistant recorded its time of presentation by writing the activity abbreviation on a prepared data form divided into 30, 1-min segments for each subject and labelled according to the time of day. Assistants also manually activated electromechanical devices and minicomputers controlling resources and tasks associated with respective activities, and they delivered materials to the subjects through two-way drawers when necessary.

Throughout social episodes in the recreation room (Food Three), 10-sec observational samples were taken at variable intervals averaging 5 min between samples. During each observational sample, the subjects' identification number, *i.e.*, 1, 2, and 3, were recorded directly on a schematic diagram of the room by two independent observers, thus giving subjects' exact location in the room and their proximity to one another.

RESULTS

Social activity durations. A total of 33 social episodes occurred within the four groups, of which 30 were in the social recreation room and the remaining three in the workshop. Figure 2 presents the time devoted to these episodes across successive days for each group. Because no group engaged in more than one social episode per day, in all cases the values represent durations of individual episodes.

In three of the four groups (Group 4 was the exception), social activity durations were longer during triadic conditions than during corresponding dyadic conditions. The duration of triadic episodes always exceeded the corresponding dyadic durations in Groups 1 and 3, and four of five dyadic episodes were shorter than triadic ones in Group 2. In comparison, only two of seven dyadic episodes were shorter than triadic episodes in Group 4.

Figure 2 also shows that two of the groups (Groups 1 and 3) contained a lone member who never participated in dyadic episodes. Such a member also was present in Group 2, but only during the second dyadic condition. Despite the lone members' performances in the dyadic conditions, these individuals did engage in social interactions to the same ex-

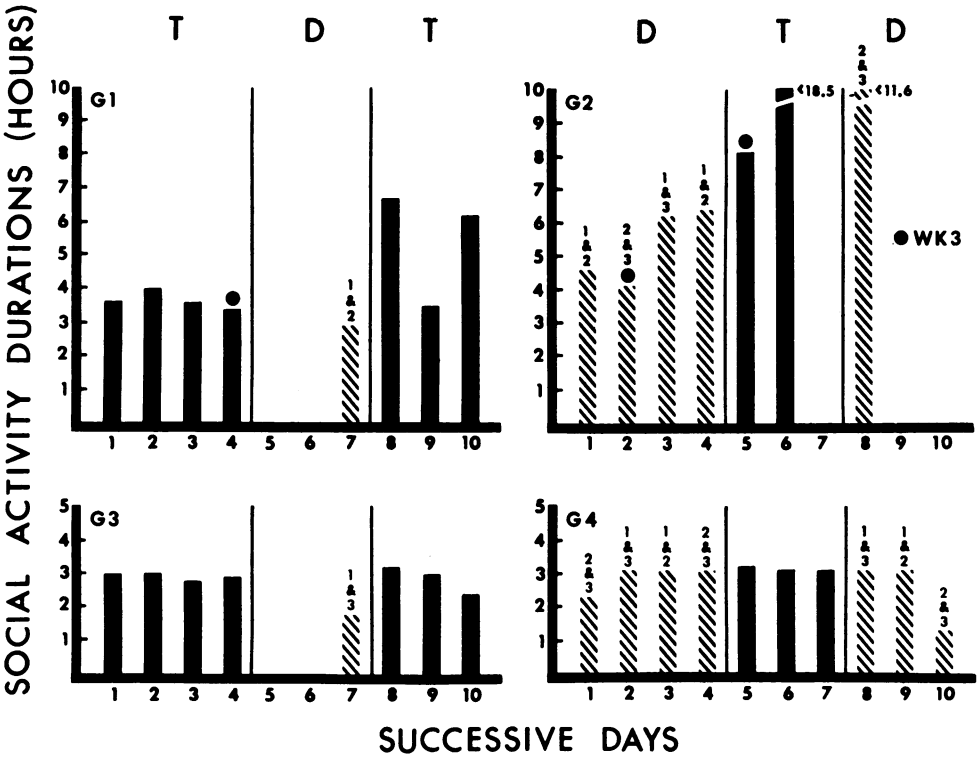


Fig. 2. Social activity durations across successive days of the experiment for all groups. Because no group engaged in more than one social episode per day, the figure bars represent durations of individual episodes. The numbers above dyadic durations identify the two subjects who engaged in the episode. T = triadic condition, D = dyadic condition.

tent as other group members during the triadic conditions.

The data in Figure 2 suggest that the order in which the program conditions were presented had some influence on the frequency of dyadic social episodes. In the cases of Groups 1 and 3, where the dyadic condition was interposed between two triadic conditions, dyadic episodes were less frequent than in Groups 2 and 4, where the triadic condition was interposed between dyadic ones.

The procedure required that social episodes be terminated whenever at least one subject decided to return to his room. In fact, all episodes appeared to be terminated by mutual agreement.

Solitary use of group areas. Eleven of the 12 subjects (Subject 3 in Group 2 was the exception) used the group areas alone when such use was permitted during the dyadic condition (Groups 1 and 2), and throughout all conditions (Groups 3 and 4). There were 46 solitary episodes, of which 29 occurred in the workshop and the remaining 17 in the recreation room.

Table 1 summarizes these data during the experiment. Comparison of the duration of episodes of solitary use with episodes of social use (see Figure 2) indicates that solitary use generally was briefer, suggesting that social interactions added to the reinforcing properties of access to the group areas. On the average, social episodes lasted for 4.4 hr (range: 1.3 to 18.5 hr) in comparison with an average solitary duration of 1.9 hr (range: 0.7 to 6.5 hr). The extent of solitary use of the group areas was not, however, clearly related to social use as evidenced by dyadic interactions. In two of the three groups containing a lone member, this individual showed the highest frequency of solitary use (Group 1, Subject 3; Group 2, Subject 1), but in the remaining group, the lone member was intermediate in this regard (Group 3, Subject 2).

Wake-sleep cycles. With the possible exception of Subjects 1 and 2 in Group 1, subjects departed from a wake-sleep cycle oriented to a

Table 1

Hours of Solitary Use of Group Areas per Selection[b]

		Days									
		1	2	3	4	5	6	7	8	9	10
G1	S1					2.1	6.1+				
	S2					1.4					
	S3					6.5+	1.1 0.8+				
G2	S1		3.2+						6.1+		3.9+ 0.7+
	S2				1.6+						0.8+
	S3										
G3	S1	1.0	1.9+	1.0	1.3	1.4 1.7+	1.2+ 0.9 2.1+	1.5+ 1.0	1.3+ 1.0	1.6+ 0.9	1.1+ 1.1
	S2			1.5	1.8+	2.2	2.4	1.9			
	S3	1.6+									1.3+
G4	S1		1.4+								2.3+ 0.7
	S2		1.3+	0.8+	0.8+		1.5+				
	S3							3.1+	3.0+	3.0+	

[b]If more than one solitary selection occurred per day by a subject, the entries appear one below the other. + = Work Three; all other entries are for Food Three.

typical day-night rhythm, *i.e.*, one in which sleep periods tend to fall within midnight and eight a.m. Figure 3 presents successive wake and sleep durations across the temporal course of the experiment for all subjects. By comparing periods of waking and sleeping with the reference "real-time" intervals at the top and bottom of the figure, departures from usual

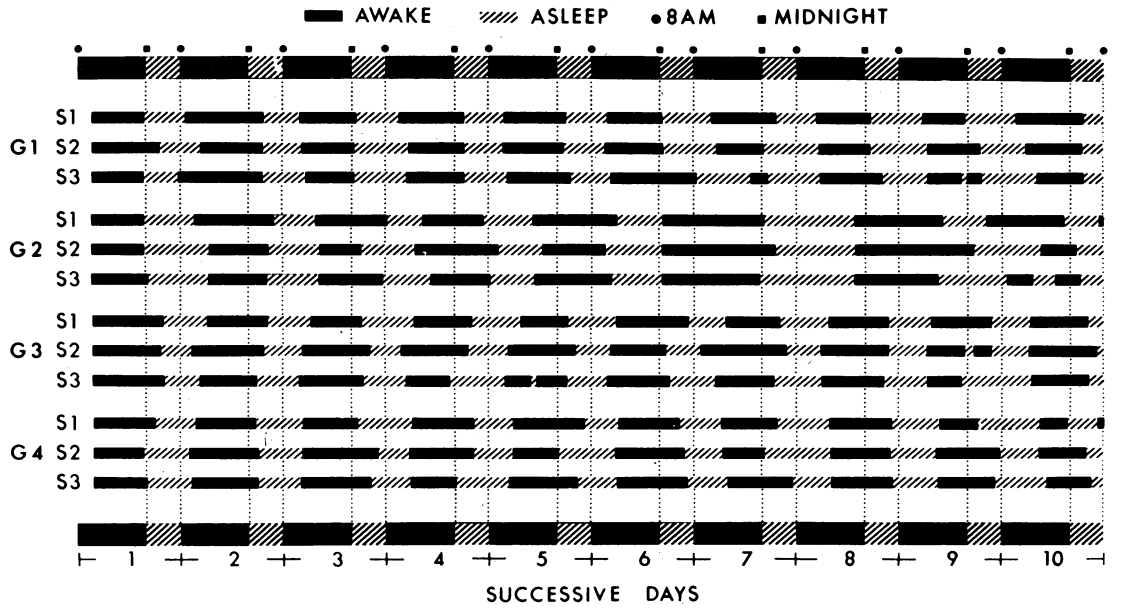


Fig. 3. Successive wake and sleep durations across the temporal course of the experiment for all subjects in each group.

sleep patterns may be seen. Although there were wide differences in sleep patterns from subject to subject, in most cases, sleep periods began after midnight, extending well beyond eight a.m., and in some cases, the majority of the period occurred during the usual daylight hours. These deviations occurred despite the presence of a clock in each private room showing time-of-day, day-of-week, and day-of-month. Figure 3 also shows that brief sleep durations (*i.e.,* naps) occurred infrequently. Once the sleep activity was selected, it was almost never interrupted, irrespective of its time of onset.

Intersubject program synchronization. Because the selection and completion of activities within the behavioral program were not oriented to "clock" time, it was possible for subjects to pace their progressions through the program at different rates and to be discrepant in their waking and sleeping patterns. To reflect the extent to which subjects' activity selections were in harmony with one another, intersubject program synchronization was assessed each day in terms of whenever subjects were within the same sequential position in the behavioral program. One measure of synchrony was the total time when all three group members were engaged in the same private activity, *e.g.,* Health Check, Sleep, Manual Behavior, *etc.* A second measure was the total time when subjects were within the group areas simultaneously. Such simultaneous occupancy could occur only as a triad during the triadic conditions ("triadic time"), but during the dyadic conditions, it also was possible for two subjects to be within one group area, *e.g.,* the recreation room, and the third subject to be within the other group area alone, *e.g.,* the workshop ("common time"). A third measure was the total time that subjects were engaged in different activities within the same group of optional activities (see last three columns of Figure 1), *e.g.,* two subjects in Reading and one subject in Work Two.

Figure 4 presents total hours of intersubject program synchronization for each group across successive days of the experiment. The figure shows relative contributions to synchrony attributable to simultaneous sleep, triadic and common time, and all other synchronous overlap in the behavioral program.

Within all groups, triadic time during triadic conditions exceeded common time during corresponding dyadic conditions; for Groups 1

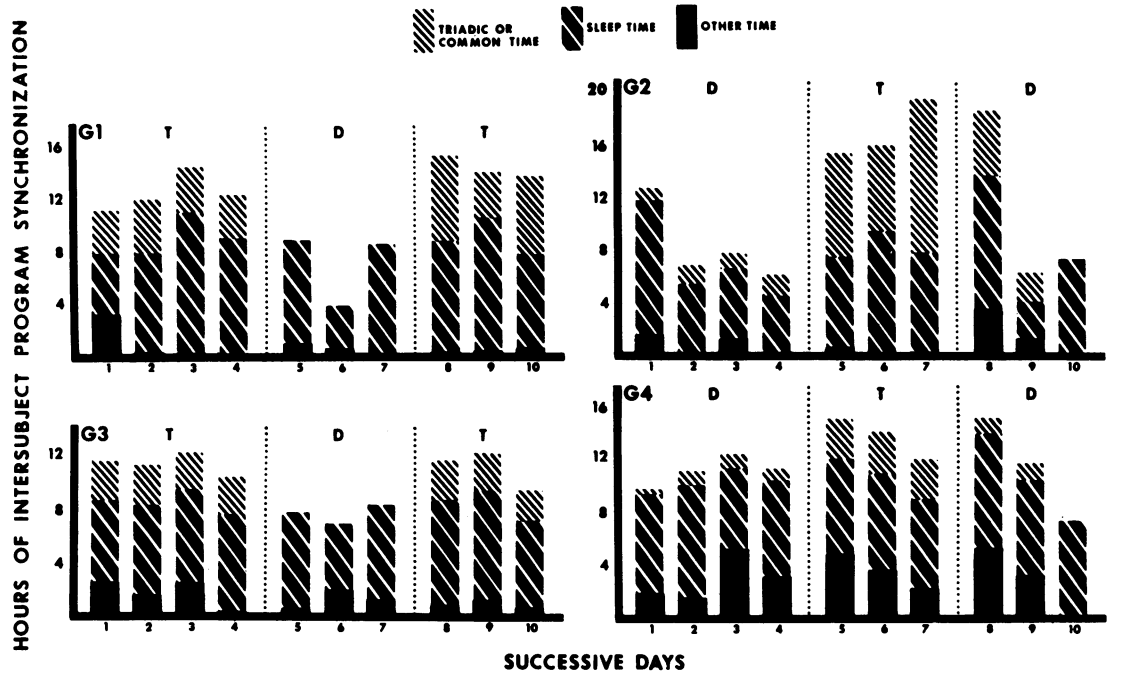


Fig. 4. Total hours of intersubject program synchronization for each group across successive days of the experiment. See text for full description of this measure. T = triadic condition, D = dyadic condition.

and 3, no common time was observed during dyadic conditions, and for Groups 2 and 4, common time was absent on Day 10. Thus, patterns of group-area use changed during the dyadic conditions so that when two subjects were in one area together, the third subject most often was not within the other area. Figure 4 also shows that the least amount of simultaneous sleep occurred during the dyadic conditions, and that other time in synchrony was not systematically influenced by the two program conditions. In effect, then, differences in synchrony between the two program conditions are attributable, for the most part, to differences in simultaneous sleep and social activity durations. Such differences indicate that, within groups, selection and completion of behavioral program activities were less harmonious during dyadic conditions than during triadic conditions.

Intercom use. On occasion throughout the experiment, one group member attempted to initiate a conversation using the intercom (by choosing the Communications activity) but his signal was not responded to by either of the other two members. The frequency of such communication failure within each of the groups is summarized in Figure 5 across successive days. The figure suggests that difficulties with regard to communication tended to be greater in the dyadic condition than the triadic condition, most notably in Group 3 and to lesser extents in the other groups.

The frequency and duration of dyadic and triadic conversations and the duration of time

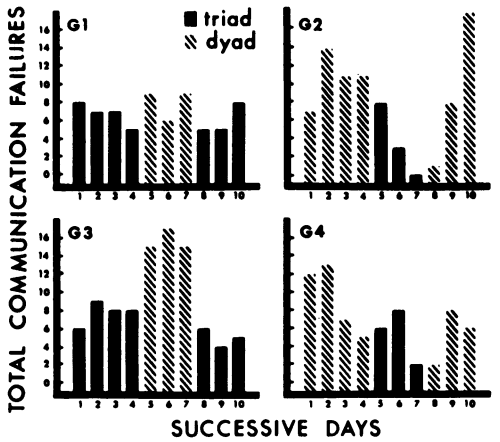


Fig. 5. Total communication failures for each group across successive days of the experiment.

alone that immediately preceded a conversation were not as clearly related to the program conditions as were communication failures. Thus, even though conversations were more difficult to arrange during dyadic conditions, possibly due to low levels of synchrony, subjects persisted in calling one another until conversation resulted.

Group arithmetic problems. Although there was considerable variation from group to group and among subjects within groups, all subjects contributed solutions to the arithmetic problems needed to meet the criterion for access to the social areas. The analysis of duration of social episodes described above (see Figure 2) indicated differences between activities in the social areas as a function of condition, since social episodes tended to be longer under the triadic than the dyadic conditions. By comparison, clear differences between conditions did not emerge with regard to the arithmetic problems activity, the behavior on which the dyadic and triadic social opportunities was contingent.

Social distance. A social distance score was computed for each subject, based on his physical proximity to the other two subjects during triadic social episodes. A given subject's score is the sum of the distances between himself and the other two subjects. Interrater reliability on which distance scores were based was high (correlation = + 0.96). Figure 6 summarizes each subject's mean social distance score, averaged over triadic episodes and rank ordered from high to low. Also shown in the figure is the percentage of time each subject spent in dyadic social episodes during the dyadic condition of the experiment where the procedure required that one member be excluded. Figure 6 reveals a substantial inverse relationship between these measures of social behavior during the dyadic and triadic conditions (correlation = − 0.79). Those subjects who spent the least time in social episodes under the dyadic condition tended to maintain the greatest social distance when all three members were participating in triadic social episodes. Conversely, the subjects with the greatest involvement in dyadic social episodes maintained the least physical distance in triadic episodes.

Additional observations. Based on means within successive program conditions, the mean wake duration for all subjects was 14.4

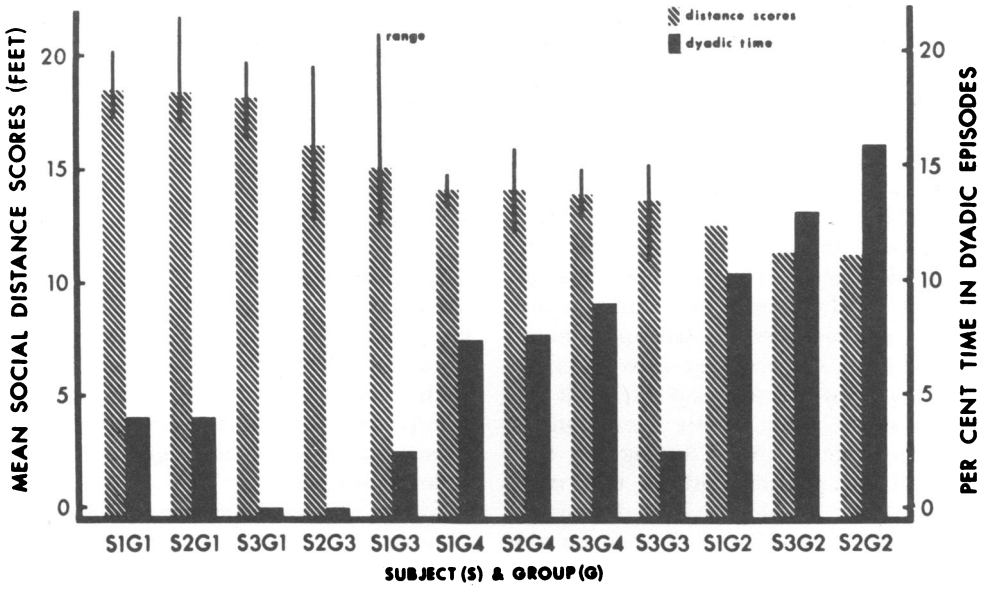


Fig. 6. All subjects' mean social-distance scores, rank ordered from high to low, plotted against corresponding per cents of time in dyadic social episodes during dyadic conditions. The ranges of social-distance scores between episodes are given for all groups except Group 2, which had only one triadic episode.

hr (range: 9.2 to 22.5 hr), and the mean sleep duration was 10.5 hr (range: 5.7 to 16.8 hr). On the Physical Exercise task, errors progressively declined over trials for all subjects. On the Private Arithmetic Problems task, error frequency decreased for 11 subjects, and the latencies of correct answers progressively decreased for all subjects over trials. On a self-report scale completed during Health Check, subjects rated the dyadic condition as aversive in comparison to benign ratings of the triadic condition. On the Lorr's Outpatient Mood Scale (Lorr, Daston, and Smith, 1967), affective states were reported to be stable between conditions, with the exception of a slight elevation in inert-fatigued ratings during the triadic conditions for subjects in Groups 3 and 4. Finally, subjects in Groups 3 and 4 reported decreasing degrees of "cheerfulness", "composure", and "energy" as a function of measuring time within the experiment.

DISCUSSION

The present results show that the status of a closed three-person social system changed when social opportunities were limited to *dyads* as compared to the *triad*. Under dyadic conditions, durations of social contact were briefer, and performance schedules drifted apart, as reflected by decreased levels of harmony in the selection and completion of behavioral program activities. Additionally, attempts by the subjects to communicate with one another on the intercom were less likely to meet with success during dyadic than triadic conditions. These results illustrate the group fragmentation effects previously observed during a noncooperation condition (Emurian *et al.*, 1976) in a situation in which triadic social interactions were prohibited, rather than being optionally available.

Although division of group members occurred during the previously studied noncooperation condition, all subjects continued to have both dyadic and triadic social interactions, and, consequently, no subject was ever completely isolated from group activities. In the present experiment, however, group fragmentation effects were stronger during the dyadic condition than observed under the noncooperation condition. Under dyadic conditions, three groups had a lone member who failed to have any direct social contact for several successive days (the single dyadic condition in Groups 1 and 3, and the second dyadic condition in Group 2). These differences may be attributable, at least in part, to the more demanding contingencies that were in effect for social contract under dyadic con-

ditions. Under dyadic conditions, responding was required on the group task, and two subjects had to cooperate in the choice of a group area before social behavior could occur. That dyadic episodes occurred at all when free access to the large group areas was available shows the reinforcing strength of even such minimal social contact.

The triadic condition was associated with longer periods of social contact than those observed under dyadic conditions. Under triadic conditions, lone members in Groups 1 and 3 were immediately reintegrated into social activities that continued to occur on each successive day of the final triadic condition. In Group 2, the lone member during the final dyadic condition participated in two unusually long triadic social activities during the preceding triadic condition, one such episode lasting 18.5 hr in the recreation room. In Group 4, triadic durations were always of maximum duration, whereas two of the three dyadic episodes with Subjects 2 and 3 were below the maximum duration. As also demonstrated by the cooperation condition, these effects show the strength of triadic social interactions as reinforcers, even for subjects who were not disposed to engage in dyadic social contact, either preferring to be alone or being deliberately excluded from social activities.

Although subjects in at least three of the four groups showed marked and variable departure from a wake-sleep rhythm oriented to "real-time" day-night intervals, the triadic condition was always associated with more schedule synchrony among subjects within a given group in comparison to such synchrony observed under dyadic conditions. These latter effects are similar to those observed in the previous study, in which the cooperation condition produced a greater magnitude of synchrony than the noncooperation condition. Enhanced synchrony observed under both cooperation and triadic conditions in the two studies substantiates the importance of triadic social opportunities as the mechanism by which intersubject discrepancies in the selection and completion of behavioral program activities were diminished.

Personal space has been defined as ". . . the area immediately surrounding the individual in which the majority of his interactions with others takes place" (Little, 1965, p. 237). Within the social psychological literature, personal space has been studied as a dependent variable under such general headings as situational impersonality, interaction distance, invasion and defense of personal space, and interperson distance and status (Shaw, 1971, Chapter 5). That this measure is sensitive to a host of situational and personal history variables appears well established. In the present experiment, the personal space associated with each group member (*i.e.*, social distance) was informative about potential social interactions on other occasions. Social-distance measures obtained within the triadic setting predicted with reasonable accuracy the sociability of group members under conditions when the group was required to fragment for social episodes to occur.

Many of the differences and relationships observed between the two program conditions depend, of course, on intersubject variability within the recruited groups of subjects. Subjects were drawn from a relatively homogeneous population, but no attempt was made to match or control them with respect to intellectual, personality, demographic, social history, and other variables, some of which have been very carefully controlled in other studies of group behavior in isolation (*e.g.*, Smith and Haythorn, 1972). Although intersubject variability may indicate a lack of understanding and control of relevant antecedent variables (Sidman, 1960, part III), its manifestation under different experimental conditions may yield information having practical relevance to the design of living situations where its presence cannot be easily avoided (Sells and Gunderson, 1972).

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